35 MPG RX8 by Paul Lamar

This is a method of downsizing the rotary engine for highway crusing. Right now the RX8 engine is running at about 3250 RPM at 65 MPH and getting 25 MPG. My guess it is using about 30 HP to go 65 MPH. That would be a fuel burn of around 2.6 gallons an hour or 15.6 pounds per hour or a BSFC of around .52. BSFC is defined as the number of pounds of fuel burned for every HP generated in one hour. This old chart from NSU illustrates the problem.

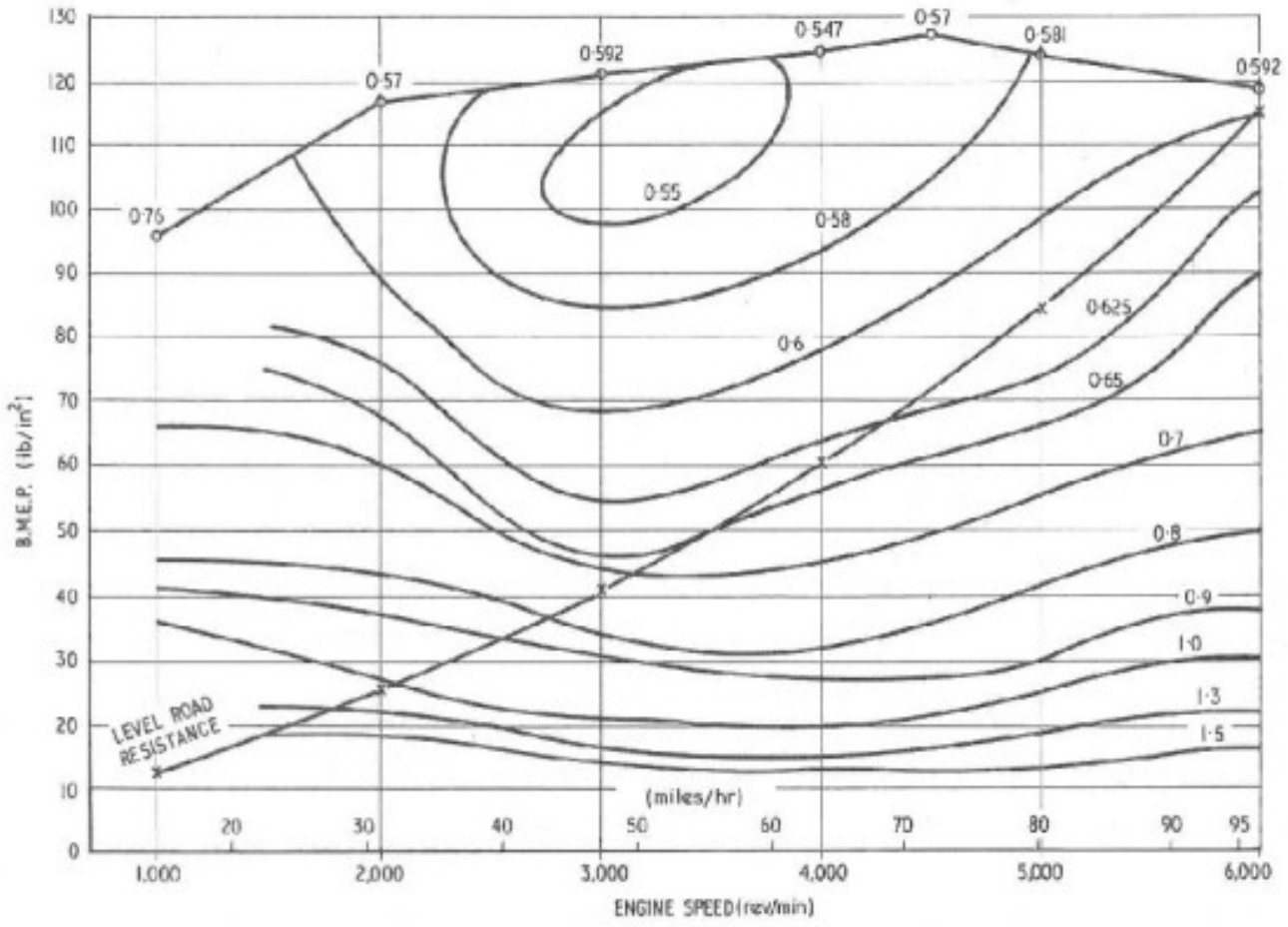


Fig. 13.7. Fuel consumption of NSU KKM 502 engine as well as the resistance encountered by the car and expressed as b.m.e.p.

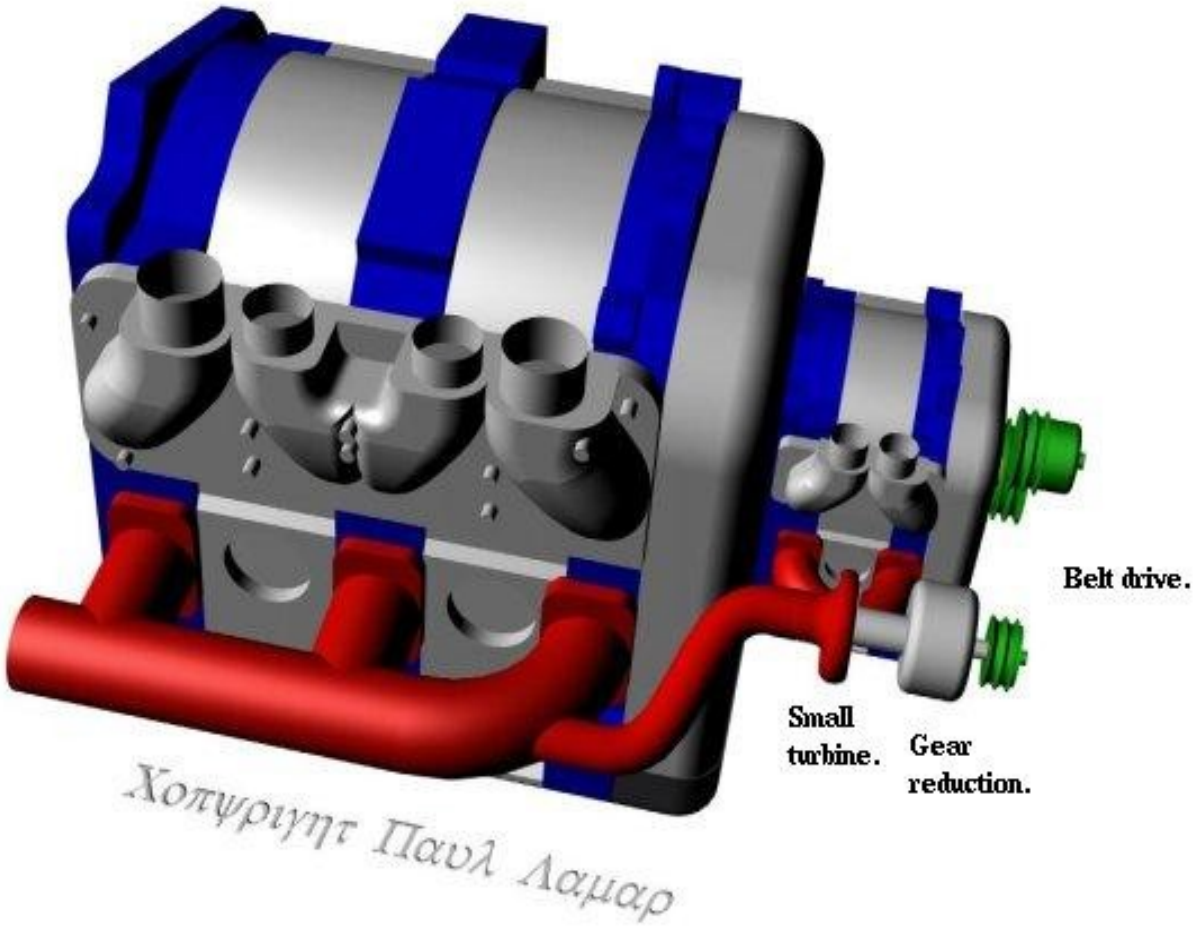
An RX8 engine running at the best BSFC point should be around .47 according to the measurements some have made in aircraft service.

This high BSFC problem in common with all cars. The best BSFC point for the engine is rarely at highway speeds or highway RPMs. The main reason smaller engines get better MPG on the highway is the small engines are running in a higher efficiency levels. Namely wider throttle openings.

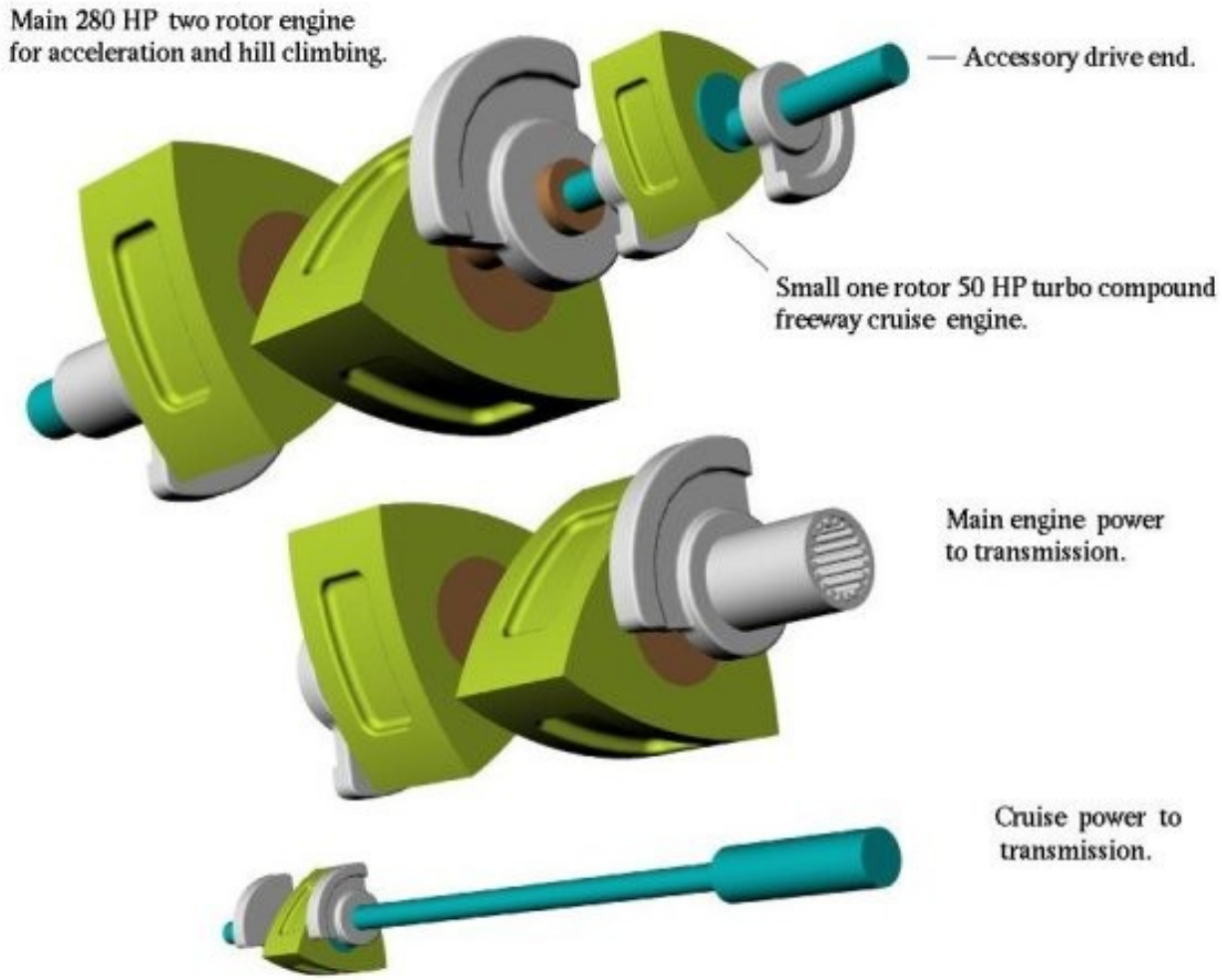
Putting smaller engines in cars with higher axle ratios (lower engine RPM) to improve the MPG is called down sizing and down speeding. So a smaller rotary engine would get better MPG in an RX8 car at steady speeds of around 65 MPH.

A turbo compound rotary could achieve a BSFC of about .38. Turbo compound engines use small turbines extracting HP from the 50% waste energy in a gallon of gas and feeding it back into the output shaft. A well known technology from the 1950's used in airliner piston engines. One of the problems with these A/C engines was the failure of an exhaust valve would take out the turbine. Needless to say the rotary has no exhaust valves. The 8 HP turbine would be geared down by at least ten to one. Working backwards a BSFC of .38 would be a fuel burn for 30 HP of 11.4 pounds per hour or 1.9 gallons per hour or a MPG of 34.2 MPG at 65 MPH.

The trouble with turbo compounding a 240 peak HP engine while running at 30 HP is it does not appear to work. What we need is a small rotary running at 80% of peak power or more to achieve a BSFC of .38 with a turbo compound configuration. Here is an illustration of a three rotor engine with a small rotor connected to the front of it.



One of the unique features of a wankel engine is the possibility of drilling a straight hole through the output shaft from end to end. If we design a small single rotor turbo compound engine of around 50 HP we can achieve 35 MPG on the highway at a steady speed of 65 MPH. What you want to do is stop the not needed rotors as they consume friction HP. This beats the current Daimler/Chrysler 4-8 engine as the deactivated pistons don't have to go along for a free ride. Less overall engine friction.



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This engine can feed its power through the large two rotor engine shaft while the two rotor engine is shut down. The large engine is only needed for acceleration and climbing hills. All accessories such as water pump and alternator would be driven by the small engine.

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